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ENDANGERED SPECIES

Technical Bulletin

U.S. Department of the Interior
Fish and Wildlife Service

Following Steady Recovery, the Arctic Peregrine Falcon is Proposed for Removal from the List of Threatened Species

After 20 years of protection marked by steady progress toward recovery, the arctic peregrine falcon (*Falco peregrinus tundrius*) was proposed September 30, 1993, for removal from the list of Threatened species. Once a victim of DDT, this northern peregrine subspecies rebounded following the U.S. ban on pesticides that caused eggshell thinning and poor reproductive success. The delisting proposal applies to peregrine falcons that nest in arctic areas of Alaska, Canada, and Greenland but spend their winters as far south as Argentina. The arctic subspecies, one of two listed *Falco peregrinus* subspecies in North America, represents about 75 percent of the continent's peregrines.

Admired as skilled hunters whose diving flights may be as fast as 200 miles per hour, peregrine falcons declined in the 1940's and no longer nested in eastern North America by the early 1970's. Their population decline resulted from impaired eggshell production caused by an accumulation of pesticides ingested from contaminated prey. Populations began to recover after the 1972 ban of DDT. This increase was not limited to the arctic peregrine. Fish and Wildlife Service (FWS) biologists have noted that the status of the American peregrine (*F. p. anatum*) is also improving.

"Here is real evidence that the Endangered Species Act does what it was intended to do—bring species back from the brink of extinction," said FWS Director Mollie Beattie in announcing the proposal.

A final decision on the delisting proposal will be made by September 1994.

photo by William G. Mattox/Greenland Peregrine Falcon Survey

Regional endangered species staffers have reported the following news:

Region 2 - U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department biologists who conducted the 1993 spring count of adult Attwater's greater prairie-chickens (*Tympanuchus cupido attwateri*) found the population index of 456 birds unchanged from 1992. However, 13 percent increases in 2 counties masked declines elsewhere. Attwater's greater prairie-chickens survive in only 3 populations—of 60, 24, and 372 birds—distributed in 5 counties in coastal Texas. The two smaller populations will be especially vulnerable in the next few years.

On and near the Attwater Prairie Chicken National Wildlife Refuge in eastern Texas, the number of birds declined 39 percent from 1992 levels. The decline was expected because of poor reproduction, as indicated by the brood survey. The ratio of young to adults was 0.27:1, but at least a 1:1 ratio is needed for a stable population. Heavy rains throughout last year's breeding season probably contributed significantly to poor numbers in the Refuge area by washing away the nests of these ground-nesting birds or interfering with their reproduction. Unfortunately, 1993 brood surveys indicate further population declines, attributable in part to excessive rainfall. On the Refuge, the ratio of young to adults was 0.18:1. A decline of 37 percent of the population is expected by the spring of 1994, with about 20 birds likely to survive on the Refuge.

Efforts to propagate Attwater's greater prairie-chickens for future reintroduction into the wild have had only limited success to date. Hatching rates are reasonably good, but chick survival is poor. The FWS provided Fossil Rim Wildlife Center with 43 fertile eggs in 1992. Although 42 hatched, only 5 survived to breeding age. In 1993, the five survivors—two cocks and three hens—produced 30 fertile eggs, from which 26 chicks hatched. Fossil Rim also received 14 fertile eggs collected from the wild, and 12 hatched. Unfortunately, only two of the chicks survive. Enteritis (diarrhea) accounted for 77 percent of the mortality, but the specific cause of the enteritis is unknown.

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The Lake Wales Ridge National Wildlife Refuge: Preserving a Treasure Trove of Biodiversity

by David Martin

photo by Reed Bowman

The Florida scrub jay is a crestless bird with a blue head, blue wings, and a large gray-brown patch on the back.

A new national wildlife refuge will soon be established by the Fish and Wildlife Service (FWS) to conserve a variety of endangered plants and animals endemic to a distinctive scrub vegetation community in central Florida. This area has the greatest concentration of Endangered and Threatened species in eastern North America. The refuge will include up to 19,630 acres (7,945 hectares) of undeveloped scrub habitat in as many as 12 parcels within 2 counties.

Scrub, a unique vegetation type, is restricted to coastal dunes on the Atlantic and Gulf coasts of Florida and Alabama, and on central Florida's inland ancient coastlines and their associated dunes. The most prominent ancient coastline, and the one with the most important scrub vegetation, is the Lake Wales Ridge, once the narrow southern tip of a much smaller peninsula. It has been above sea level for as long as 3 million years, and some of its sinkhole lakes have remained filled with water as long as 50,000 years, making it possible to analyze the ridge's vegetation history through pollen and macrofossil analysis. Sand dune and xeric (dry) shrubby temperate vegetation has been present the entire period, indicating that the rich endemic flora and insect fauna have had ample time to evolve in place. Today, the endemic plants of the Lake Wales Ridge are effectively isolated from other uplands with similar habitats by many miles of poorly drained lowlands.

Florida scrub resembles shrublands of arid regions, and some of its plant and animal species have southwestern affinities. Among them are the Threatened Florida scrub jay (*Aphelocoma coerulescens coerulescens*), the Endangered *Ziziphus celata*, which is a relative of the Southwest's lotebushes, and *Nolina brittoniana*, an agave-like plant. The dryness of the sandy soils during Florida's winter drought contributes to the small stature of the vegetation, although extremely low-nutrient soil is at least as significant. The most important shrubs are usually evergreen oaks, although Florida rosemary (*Ceratiola ericoides*) dominates some of the most nutrient-deficient and biologically important sites. Sand pine (*Pinus clausa*), a short-lived species, may form a canopy above the shrubs. The endemic plant species listed as Endangered include herbs, small shrubs, and a lichen that occupy bare sand between larger shrubs.

Unfortunately for its endemic plants and animals, the southern Lake Wales Ridge is the heartland of Florida's citrus industry, an area vividly described by the writer John McPhee in his book "Oranges." Severe freezes in the 1980's left citrus groves intact, encouraging the planting of more groves in the two counties at the southern tip of the ridge, where most of the endemic plants occur. In these counties, approximately 84 percent of xeric upland habitat (scrub and upland longleaf pine-turkey oak) has been converted to other uses, according to recent studies at Archbold Biological Station, an independent research center located in the southern ridge. Some of the best remaining tracts of scrub habitat have survived relatively undisturbed only because they were subdivided and sold as unimproved lots with no roads or utilities. Many of the lots were sold to people in other countries. In at least one area, however, road building may soon begin. Construction of scattered houses in such subdivisions may make conserving the rest of the area impossible.

The FWS has been active in listing species from the Lake Wales Ridge: the

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photo © Tom Eisner, Archbold Biological Station

Dicerandra christmanii ***produces cream-colored flowers marked with purplish-red spots.***

Lake Wales Ridge

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Florida scrub jay, two lizards, and 21 plants are classified as Endangered or Threatened (including *Cladonia perforata*, the first lichen to be federally listed). The listing process for plants and vertebrates is relatively complete in Florida scrub because it was feasible to carry out multi-species status surveys in this ecosystem.

If we are to conserve the Lake Wales Ridge biota, the different needs of Florida scrub animals and plants have to be met. To maintain a viable population of scrub jays, for example, scientists at Archbold Biological Station have shown that relatively large tracts of intact habitat are needed. The tracts should be located in a way that allows the birds to disperse among them. The Archbold scientists have also conducted successful censuses of the scrub jay. It appears that at least half of the ridge's remaining scrub jay habitat must be protected to ensure the jay's survival. Because scrub jays (and, by extension, the habitat they occupy) are protected from take by the Endangered Species Act, the FWS is working to develop habitat conservation plans for the Florida scrub jay throughout its range. Such plans must take into account other listed species in the tracts occupied by the scrub jay, including plants.

Virtually every listed plant species has its own, individual geographic distribution. Some of the distributions are extremely limited, making it essential to protect certain sites, even though doing so will not protect all of the plants. The best remaining sites for the scrub lupine (*Lupinus aridorum*) are so small that they may not be readily protected. Fortunately, most of the plant species can be effectively conserved if action is taken promptly at enough sites. Because land development is proceeding rapidly, the FWS (along with the State of Florida and private conservation organizations) have concluded that methods other than land acquisition, such as conservation easements, will not be adequate or timely in this case. The Lake Wales Ridge National Wildlife Refuge was designed primarily to acquire the most important sites for plant conservation, while attempting to ensure that the tracts will be large enough for adequate management (including burning at infrequent intervals).

photo by Reed Bowman

Liatris ohiinger ***flowers are a brilliant pink.***

The beginnings of a biological preserve system for the Lake Wales Ridge species already exist, including Archbold Biological Station, small Nature Conservancy preserves, a new 13,000-acre (5,260-ha) State forest and park, and three other recently purchased State tracts. Further State land purchases are under way. The State of Florida's Preservation 2000 land acquisition program (with $900 million of funding in 3 years) has placed a high priority on conserving the Lake Wales Ridge and its vicinity. The State is likely to acquire considerably more land than the FWS.

The proposed network of biological preserves, including State lands, private preserves, and the new national wildlife refuge, has the potential to protect one of the most important centers of endemism in eastern North America. The preserves offer excellent opportunities for environmental education because of the area's proximity to the Tampa Bay and Orlando metropolitan areas, and the research and educational resources of Archbold Biological Station and Bok Tower Gardens, a botanical garden with an active endangered species program as well as two listed plants native to its grounds. A Scrub Appreciation Day staged in the fall of 1992 by the State and a county government drew a big crowd, and the Florida Native Plant Society's 1993 and 1994 annual meetings are featuring scrub vegetation.

David Martin is a botanist with the FWS Jacksonville, Florida, Field Office.

Bring Back the Natives: Restoring Native Aquatic Species on Public Lands

by Christopher A. Wood, Andrew P. Martin, and Jack E. Williams

photo by Dennis Tol

Lahontan cutthroat trout

"*Bring Back the Natives*" is a national campaign designed to improve the status of native aquatic species on public lands through riparian area rehabilitation, watershed restoration, and species reintroduction. This program emphasizes the application of ecosystem management principles to public lands managed by the Bureau of Land Management (BLM) and the Forest Service in order to conserve, restore, and maintain aquatic biological diversity. It was developed in 1992 by the BLM, Forest Service, and National Fish and Wildlife Foundation (Foundation).

Bring Back the Natives was developed in response to a decline in riparian and aquatic ecosystem health and concerns about the viability of many associated aquatic species. According to The Nature Conservancy, aquatic species in North America are becoming endangered and extinct at a much faster rate than terrestrial animals [1]. Studies by the American Fisheries Society have documented that fully 33 percent of North American native freshwater fish species[2] and 70 percent of the freshwater mussels[3] are considered Endangered, Threatened, or of special concern.

The degradation of aquatic systems is manifested by localized and widespread extinctions of native flora and fauna across a broad range of ecosystems. In 1991, the American Fisheries Society reported that at least 106 populations of salmon (*Oncorhynchus* spp.), steelhead (*Oncorhynchus mykiss*), and sea-run cutthroat trout (*Oncorhynchus clarki*) were extirpated in the western United States.[4] The report also identified 214 other anadromous salmonid populations at risk of extirpation. Many resident trout species are facing extinction because of habitat degradation and hybridization with hatchery-raised trout. For example, introgression with introduced brook trout (*Salvelinus fontinalis*) threatens the viability of native bull trout (*Salvelinus confluentis*) populations in the western U.S.

Public lands often provide the best, or sometimes last, remaining habitats for many imperiled aquatic species. The more than 461 million acres (187 million hectares) of land managed by the Forest Service and the BLM provide habitat for almost 69 percent of the fish species in the U.S. listed as Threatened or Endangered and 61 percent of the fishes that are candidates for listing. Conservation efforts on public lands obviously can make a critical difference to the survival of listed aquatic species. In the western U.S., the Forest Service and the BLM often manage lands within the same watershed, with the forested lands in the headwaters and the BLM lands downstream. Historically, restoration efforts for aquatic species generally did not transcend administrative boundaries. *Bring Back the Natives*, however, is designed to facilitate interagency restoration efforts for aquatic species. The Foundation participates by providing challenge grants to both agencies.

Riparian and Watershed Approaches to Restoration

Riparian and aquatic ecosystems serve as excellent indicators for the ecological health of the land. A large percentage of species listed under the Endangered Species Act depend on rivers, streams, riparian areas, and wetlands for their survival. It does not bode well for imperiled species that aquatic ecosystems appear to be declining at an alarming rate. The 1982 National Rivers Inventory found that fewer than 2 percent of the streams in the conterminous 48 States remained at high natural quality. Habitat loss and alteration were the major contributors to the demise of approximately 75 percent of the 40 North American fish species that have become extinct since 1900[5]. Habitat degradation and loss were also identified as the leading factors in the decline of

[1] Master, L.L. 1990. The imperilled status of North American aquatic animals. Biodiversity Network News. 3:3.

[2] Williams, J.E., J.E. Johnson, D.A. Hendricksen, S. Contreras-Balderas, J.D. Williams, M. Navarro-Mendoza, D.E McAllister, and J.E. Deacon. 1989. Fishes of North America endangered, threatened, or of special concern: 1989. Fisheries 14(6): 2-20.

[3] Williams, J.D., M.L. Warren, Jr., K.S. Cummings, J.L. Harris, and R.J. Neves. 1993. Conservation status of freshwater mussels of the United States and Canada. Fisheries. 18(9): 6-22.

[4] Nehlsen, W., J.E. Williams and J.A. Lichatowich. 1991. Pacific salmon at the crossroads: stocks at risk from California, Oregon, Idaho, and Washington. Fisheries 16(2): 4-21.

[5] Miller, R.R., J.D. Williams, and J.E. Williams. 1989. Extinctions of North American fishes during the past century. Fisheries 14(6): 22-38.

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salmon, steelhead, and sea-run cutthroat trout[4].

Most of the campaign's projects involve some degree of riparian area restoration, along with improved land management practices within these critically important areas. In the 48 conterminous States, riparian areas represent a tiny percentage of the total land base, but they possess a greatly disproportionate ecological value. For instance, in the intermountain region of the western U.S., riparian areas are more productive in terms of plant and animal diversity and biomass per unit area than the remainder of the entire land base[6]. In another example, a recent report to Congress estimates that in the Blue Mountains of Oregon, 75 percent of the known terrestrial species either depend directly on riparian areas or use them more than other habitats. Properly functioning riparian areas provide such habitat features as good water quality, large woody debris input, reduced sediment loads, and increased bank stability. These areas also store water, reduce flooding, and provide for late season flows.

There are no quick or easy ways to repair degraded riparian and aquatic habitats. Traditional stream improvement and habitat enhancement strategies typically involve mitigation measures, such as placing log weirs or gabions (cylinders filled with earth or stone) into the stream channel or along the stream bank. Artificial structures are generally designed to mitigate the effects of increased sediment flow or loss of woody debris. In the past, many projects were designed with the belief that instream structures were capable of compensating for the effects on aquatic habitats of such land disturbing activities as logging and road building. Thus, Federal land management agencies devoted much of their energy and budgets to "improving" spawning and rearing areas through the placement of these structures. Although effective in some instances, the construction and placement of artificial structures only treat the symptoms of watershed degradation, not the causes, and typify a "band-aid approach" to watershed restoration. The *Bring Back the Natives* strategy seeks to intertwine habitat enhancement projects with revised land management practices to eliminate the causes as well as the symptoms of watershed degradation.

Many fish restoration efforts are unsuccessful because they are not undertaken from a watershed or basin perspective. The increasing rarity and loss of anadromous fish stocks indicate that the health and productive capacity of watersheds are diminishing. Successful watershed restoration must involve the protection and linkage of remaining healthy headwater streams to riparian areas and floodplains. Many imperilled aquatic species depend on small creeks and tributaries for spawning and rearing habitat. First and second order streams, which often include non-fish bearing and intermittent streams, may represent more than 70 percent of the collective channel width of the Pacific Northwest[7]. As Sedell et al.[8] point out, effective conservation and restoration strategies must protect aquatic ecosystem

photo by Laura Gutzwiller

photo by Joe Viray

In 1987, this stretch of the Marys River, once important habitat for the Lahontan cutthroat trout, was almost devoid of streamside vegetation. By the summer of 1993, however, better management of livestock grazing had restored the riparian habitat.

[6] Burton, T., and nine co-authors. 1992. Integrated riparian evaluation guide. Intermountain Region. Technical riparian work group. USDA Forest Service.

[7] Benda, L., T.J. Beechie, R.C. Wissmar, and A. Johnson. 1992. Morphology and evolution of salmonid habitats in a recently deglaciated river basin, Washington state. Canadian Journal of Fisheries and Aquatic Sciences. 49: 1246-1256.

[8] Sedell J.R., G.H. Reeves and 20 others. Aquatic ecosystem assessment *in* Forest Ecosystem Management: An ecological, economic, and social assessment. Report of the Forest Ecosystem Management Assessment Team. 1993. V: 1-96.

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forms and processes at the watershed scale and recognize that land ownership patterns rarely coincide with distinct topographic boundaries.

The *Bring Back the Natives* Program

Riparian areas, small creeks, and tributaries often provide the last quality habitats for aquatic species. The *Bring Back the Natives* program uses these areas as the cornerstone for efforts to restore and maintain at-risk fish stocks and to rebuild the productive capacity of native fish populations. Preserving the biodiversity and ecological integrity of unique areas is an essential component of the restoration strategy. Most projects take place in habitats and watersheds that have a high "restoration potential." Restoration activities often involve the removal of exotic, introduced fish species that out-compete and introgress with native fish populations. By coupling restoration activities with improvements in land management, the program safeguards the genetic integrity and long-term viability of endemic aquatic species and the habitat upon which they depend.

Building partnerships is a critical component. The help and guidance of State fish and wildlife agencies is essential to many projects. For example, much of the labor necessary for fencing and revegetation efforts typically is accomplished through volunteers from local fishing, conservation, and school groups. More than 15 local chapters of Trout Unlimited contributed hundreds of hours of volunteer labor in 1993.

Nominations for projects are solicited from Forest Service and BLM field offices, and are evaluated by the following four criteria. Each project should identify:

1. an ecological approach to stream and watershed restoration, cooperative efforts with State and Federal agencies to reintroduce native aquatic species, and revised land management practices that eliminate the cause(s) of degradation;

2. a major segment of the habitat of a species, stock, or community complex so as to have a significant impact on the overall status of the species and the ecosystems on which they depend;

3. the participation of partners (e.g., State, local, Tribal, and non-governmental organizations, businesses, and individuals), particularly those that can contribute non-federal dollars and non-federal professional services and/or materials to match a National Fish and Wildlife Foundation grant; and

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	1992	1993
Number of *Bring Back the Natives* Projects	20 in 8 States	34 in 13 States
Joint Forest Service / BLM Projects	9	15
National Fish and Wildlife Foundation contributions	$250,000	$400,000
Non-federal contributions	$250,000	$420,000 (est)
BLM *BBN* contributions	$ 96,975	$488,150
Forest Service *BBN* contributions	$ 62,000	$329,550

Project and Financial Summary for the First 2 Years of the* Bring Back the Natives *Campaign

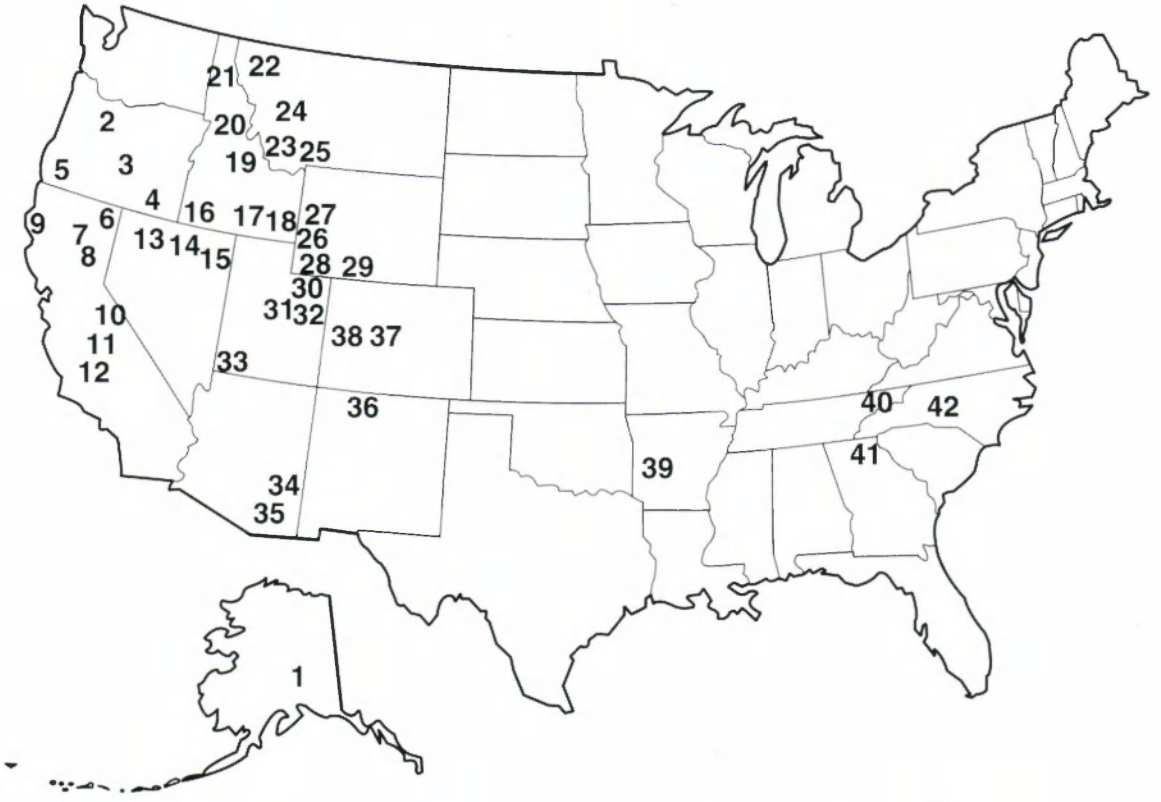
The Marys River Project

The Marys River Project is an ambitious undertaking directed at restoring more than 180 miles (290 km) of habitat for a Threatened fish, the Lahontan cutthroat trout *(Oncorhynchus clarki henshawi),* in Nevada on the Humboldt National Forest and the BLM's Elko District. The Marys River and its tributaries are part of the Humboldt River drainage. Historically, more than 2,210 miles (3,555 km) of the drainage were occupied by Lahontan cutthroats. Currently, however, only 313 miles (503 km) of the entire Humboldt drainage provide suitable habitat. Lahontan cutthroats survive only as remnant populations scattered throughout the upper tributaries of the Marys River. The middle and lower portions of the Marys River system are only in poor to fair condition.

The Marys River project incorporates all four primary *Bring Back the Natives* criteria. Its master plan outlines an ecological approach to restoration with the main emphasis placed on improving land use practices. Intensive management of livestock through fencing, exclusion, pasture rest, and rotation should allow the recovery of riparian areas. A significant increase in the amount of available Lahontan cutthroat habitat should result, contributing to eventual recovery. The Marys River restoration project is a joint Forest Service/ BLM venture that involves a host of other cooperators, including the National Fish and Wildlife Foundation, American Forestry Association, Nevada Department of Wildlife, Northeastern Nevada Chapter of Trout Unlimited, Barrick-Goldstrike Mines, Nevada Mining Association, Newmont Gold Company, and Coors Brewing Company.

The Marys River Project will continue through the end of the decade. Activities scheduled for 1994 include: continued fencing of riparian areas, spring protection in grazing areas, implementation of new grazing and recreation plans to lessen adverse impacts, construction of stockwater wells to provide livestock water sources away from riparian areas, installation of thermograph stations to monitor water temperatures, and improvements to the macroinvertebrate monitoring program.

Bring Back the Natives
1992 and 1993 project locations



Project Name	Project 1992	Year 1993	Project Name	Project 1992	Year 1993
1. Resurrection Creek (AK)		X	22. Rogers Lake (MT)		X
2. Crooked River Watershed (OR)		X	23. Big Hole River (MT)		X
3. Wickiup Creek (OR)	X		24. Blackfoot River (MT)		X
4. Borax Lake (OR)		X	25. Madison River (MT)	X	
5. Jenny Creek (OR)		X	26. LaBarge Creek (WY)	X	X
6. Upper Pit River (CA)		X	27. Thomas Fk. Watershed (WY)		X
7. Dutch Flat Creek (CA)	X		28. Currant/Sage Creeks (WY)		X
8. Sierra-Cascade-Great Basin (CA)		X	29. Littlefield Creek (WY)	X	X
9. Mattole River (CA)		X	30. West Fk. Smith River (UT)	X	
10. Cottonwood Creek (CA)		X	31. Nebo Creek (UT)		X
11. Kern River (CA)		X	32. Bitter Creek (UT)		X
12. South Fork Kern River (CA)		X	33. Boulder/Bunker Creeks (UT)	X	
13. Eightmile Creek (NV)	X	X	34. West Fk. Black River (AZ)		X
14. Bruneau River (NV)	X	X	35. Arnett Creek (AZ)		X
15. Marys River (NV)	X	X	36. Agua Caliente (NM)	X	X
16. Southern Idaho Trout (ID)	X	X	37. Apache Creek (CO)		X
17. Midnight/Crystal Creek (ID)		X	38. Beaver Creek (CO)		X
18. Fish Haven Creek (ID)	X		39. Arkansas Darters (AR)	X	
19. Wet Creek (ID)	X		40. Tennessee Madtoms (TN)	X	
20. McComas Meadows (ID)		X	41. Little Rock Creek (GA)		X
21. Coeur d'Alene Basin (ID)		X	42. Little River Watershed (NC)		X

Threatened, endangered, and other rare aquatic species known from "Bring Back the Natives" project areas in 1992 and 1993

Taxonomic Group	Number of Species	Species
Trouts, Salmonidae	20	Apache trout, *Oncorhynchus apache* (T); golden trout, *O. aguabonita* (SL); Little Kern golden trout, *O. a. whitei* (T); Kern River rainbow trout, *O. mykiss gilberti* (C2); Eagle Lake rainbow trout, *O. mykiss* ssp. (SL), Goose Lake redband trout, *O. mykiss* ssp. (C2), Interior redband trout, *O. m. gibbsi* (C2); steelhead, *O. m. irideus* (S); Bonneville cutthroat trout, *O. clarki utah* (C2); Colorado River cutthroat, *O. c. pleuriticus* (C2); greenback cutthroat, *O. c. stomias* (T); Lahontan cutthroat, *O. c. henshawi* (T); Paiute cutthroat, *O. c. seleniris* (T); Rio Grande cutthroat, *O. c. virginalis* (T); Westslope cutthroat, *O. c. lewisi* (SL); Snake River chinook salmon, *O. tshawytscha* (T); eastern brook trout, *Salvelinus fontinalis* (S); bull trout, *S. confluentus* (C2); Montana Arctic grayling, *Thymallus arcticus montanus* (C1).
Minnows, Cyprinidae	12	Hardhead, *Mylopharodon conocephalis* (SL); Lahontan Creek tui chub, *Gila bicolor obesa* (C2); Eagle Lake tui chub, *G. bicolor* ssp. (SL); Gila chub, *G. intermedia* (C2); roundtail chub, *G. robusta* (C2); pit roach, *Lavinia symmetricus mitrulus* (C2); longfin dace, *Agosia chrysogaster* (SL); speck led dace, *Rhinichthys osculus* (SL); loach minnow, *Tiaroga cobitis* (T); Gila topminnow, *Poeciliopsis occidentalis* (E); spikedace, *Meda fulgida* (T).
Suckers, Catostomidae	5	Wall Canyon sucker, *Catostomus* sp. (C1); Modoc sucker, *C. microps* (E); Goose Lake sucker, *C. occidentalis lacusanserinus* (C2); Jenny Creek sucker, *C. rimiculus* ssp. (C2); flannelmouth sucker, *C. latipinnis* (C2).
Catfishes, Ictaluridae	2	Smokey madtom, *Noturus baileyi* (E); yellowfin madtom, *N. flavipinnis* (T).
Perches, Percidae	2	Duskytail darter, *Etheostoma* sp. (C2); longnose darter, *Percina nasuta* (C2).
Lampreys, Petromyzontidae	1	Goose Lake lamprey, *Lampetra tridentata* ssp. (C2).
Sculpins, Cottidae	1	Malheur mottled sculpin, *Cottus bairdi* ssp. (C2).
Mussels, Unionidae	3	Brook floater, *Alasmidonta varicosa* (C2); Savannah lilliput, *Toxolasma pullus* (C2); Atlantic pigtoe, *Fusconaia masoni* (C2).

Key to Status Abbreviations: **E** - Federally endangered; **T** - Federally threatened; **C1** -Category 1 listing candidate; **C2** - Category 2 species; **SL** - listed as endangered, threatened, candidate, sensitive, or species of special concern by the State; **S** - Bureau of Land Management/Forest Service sensitive.

Bring Back the Natives

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4. rivers, streams, and watersheds managed by both the Forest Service and the BLM. Exceptions are made in areas where adjacent ownership does not exist.

The Marys River project, one of the campaign's showcases, incorporates all four of the criteria (see box).

Thirty-four *Bring Back the Natives* projects were deemed eligible for funding by the Foundation in fiscal year 1993, when the Forest Service and BLM received an $800,000 challenge grant to perform aquatic habitat restoration and species reintroduction on public lands. In order to receive Foundation funding, non-federal sources (i.e., private, corporate, and State sources) must contribute an equal amount of money to the individual projects. In FY 1993, the BLM and the Forest Service also budgeted $488,150 and $329,550, respectively, toward the projects. The linkage to State and private groups is critical to the program's success and acceptance. Non-federal participation in aquatic habitat restoration efforts instills a sense of ownership in local communities and States toward individual projects *and* accountability for the condition of aquatic resources on public lands. Conservation groups, State fish and wildlife agencies, private landowners, school districts, and corporations are among the many participants and contributors. Some of these groups include Trout Unlimited, Coors Brewing Company, and even local school districts, such as Oregon's Crook County School District. In 1993, over 70 private and State groups participated in the program's projects.

* * *

In 1993, *Bring Back the Natives* projects have benefitted over 44 Threatened, Endangered, and special-concern species. Some projects contribute to recovery, while other projects may help prevent the need to list species. Equally important, cooperative efforts such as these will help to safeguard the long-term productivity and diversity of aquatic ecosystems as a whole on public lands.

C.A. Wood, A.P. Martin, and J.E. Williams are with the Bureau of Land Management, 1849 C Street NW, Washington, D.C. 20240.

Fish and Wildlife Service Reviews Comments on "Intentional Introductions" Policy

The Fish and Wildlife Service (FWS) is reviewing comments on its proposed report to Congress on the intentional introduction of non-native species to U.S. rivers and lakes and other aquatic ecosystems. The report was prepared by an interagency task force established to carry out requirements of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.

"Resolving the extremely complicated problems caused by non-native aquatic species is of utmost urgency," said Gary Edwards, the FWS Assistant Director for Fisheries and Co-Chair of the Aquatic Nuisance Species Task Force that conducted the policy review.

Nonindigenous species, whether introduced intentionally or not, threaten aquatic life by upsetting the natural balance within the ecosystem and ultimately reducing biological diversity. For example, two accidentally introduced species—the zebra mussel *(Dreissena polymorpha)* and the ruffe *(Gymnoephalus cernuus)*, a small fish in the perch family—are spreading quickly through U.S. lakes and rivers, competing with native species for food and living space. In addition, interbreeding with non-native trout introduced for sport fishing contributed to the Endangered or Threatened status of species such as the greenback cutthroat trout *(Oncorhynchus clarki stomias)*, Lahontan cutthroat trout *(Oncorhynchus clarki henshawi)*, Little Kern golden trout *(Oncorhynchus aguabonita whitei)*, and Paiute cutthroat trout *(Oncorhynchus clarki seleniris)*. Also, the introduction of the sheepshead minnow *(Cyprinodon variegatus)* into the Pecos River in Texas and New Mexico led to a hybridization problem with the native Pecos pupfish *(Cyprinodon pecosensis)*. As a result, populations of the Pecos pupfish have declined to the point that the species is now a category 1 candidate for listing protection under the Endangered Species Act.

For these reasons, while many local economies rely on funds generated by sport fisheries for intentionally stocked non-native fish, some introduced species are factors in the decline or even extinction of many aquatic wildlife species. The proposed report to Congress recommends that decisions on whether or not to introduce non-native species be based on ecosystem and biodiversity considerations that transcend State or national boundaries and identify the need for close cooperation among Federal agencies, the States, industry, and private organizations.

Announced in the *Federal Register* on August 27, 1993, the comment period closed on October 25. The Aquatic Nuisance Species task force will release its findings when the final Report to Congress is published in the coming months. Other members of the task force included the National Oceanic and Atmospheric Administration, Animal and Plant Health Inspection Service, Environmental Protection Agency, Army Corps of Engineers, Coast Guard, and Department of State. For more information contact the FWS Fisheries Office at 703/358-1718.

Court Upholds Controls on Imports of Argali Trophies

by Ron Nowak

Fish and Wildlife Service (FWS) regulations to protect the argali (*Ovis ammon*), a large wild sheep of Asia, were upheld August 12 by the U.S. District Court in Midland, Texas. Federal attorneys, primarily Chrissy Perry of the Justice Department and Mike Young of the Interior Department, successfully represented the FWS in a lawsuit brought by Safari Club International and several supporting plaintiffs that sought to overturn the regulations. A second suit, filed with the U.S. District Court for Washington, D.C., primarily by a group known as Putting People First, was dismissed August 19.

The argali, a relative of the North American bighorn sheep (*Ovis canadensis*), is among the world's most prized big game trophies. It occurs in parts of southern Siberia, Mongolia, northern and western China, Tibet, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Afghanistan, northern India and Pakistan, and Nepal. Within most of its range, the species has declined drastically through excessive hunting, habitat degradation, and competition with domestic livestock. In the June 23, 1992, *Federal Register*, the FWS classified the argali as Endangered throughout its range, except in Mongolia, Kyrgyzstan, and Tajikistan, where it was placed in the somewhat less critical category of Threatened. At the same time, special regulations were issued requiring acceptable information on argali status and management before trophies could be imported from these countries without FWS-issued permits.

The development of the argali listing and regulations had been a lengthy effort, formally beginning with a November 24, 1989, notice of review on the species' status. Throughout the process, the FWS emphasized that permits to import argali

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photo by FWS Forensics Laboratory

The massive horns of the argali, as shown in a mounted specimen, help explain the appeal of this wild sheep to some trophy hunters.

Argali

(continued from page 11)

trophies from populations listed as Threatened could be allowed if enough data were available showing that importation was beneficial to the conservation of the species overall. The benefit presumably would come from license and guide fees paid by trophy hunters, which could give the countries enough economic benefits to manage the argali on a sustainable basis.

Although the FWS solicited data on argali status and management from appropriate foreign governments and many other concerned parties, additional information on management programs was needed before imports of trophies could be allowed from Threatened populations. Even upon publication of the June 23, 1992, final listing rule, the effective date was delayed more than 6 months to avoid interfering with the next hunting season and to allow still further opportunity for comment. Moreover, the FWS funded its own survey to collect data on the status and management of certain argali populations.

Notwithstanding these efforts to accommodate hunting interests, on January 4, 1993, just after the final rule became effective, the two lawsuits were filed. The plaintiffs contended, among other things, that the argali did not warrant classification as Endangered or Threatened throughout its range, that the FWS had failed to give adequate notification of the listing proposal, and that a clause of the Endangered Species Act precluded the FWS from restricting the importation of trophies.

Citing various parties, most of whom had a professional interest in sheep hunting, the plaintiffs argued that the argali is generally well-managed and that the new FWS regulations would eliminate conservation incentives. They also contended that the species is relatively common in much of its range, with numbers appoaching 250,000. Based on information provided by such authorities as international conservationist George Schaller and the Caprinae Specialist Group of the World Conservation Union, the FWS countered that current argali management generally is questionable at best and that the species has declined seriously over most of its range, with numbers probably below 100,000. The Court upheld the FWS position, and ruled that the listing process had been carried out properly.

Much interest centered on the legal basis for importation from the three countries where the species was classified under the Endangered Species Act as Threatened. The Act generally gives total protection for species listed as Endangered. However, for species listed as Threatened, a special regulation may be issued that allows importation of sport trophies, provided that the special rule is "necessary and advisable for the conservation of such species."

Although the FWS and the plaintiffs essentially agreed that some regulated argali hunting and importation could be allowed, there was a difference relative to section 9(c)(2) of the Endangered Species Act, which refers to species on Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Appendix II presumes a lesser degree of threat than does Appendix I. Importation of an Appendix II species requires only a CITES export permit from the country of origin, whereas Appendix I requires CITES permits from both the exporting and importing countries. Section 9(c)(2) of the Act generally provides that non-commercial importation of species that are on Appendix II and not listed as Endangered shall be presumed to be in compliance with the Act. Except for one subspecies in the Himalayas and parts of China, the argali is on Appendix II of CITES.

The plaintiffs argued that, since argali populations in Kyrgyzstan, Mongolia, and Tajikistan were on Appendix II and listed as Threatened, trophies could be brought into the United States simply with a CITES export permit, and without an Endangered Species Act permit or other additional regulation. However, the FWS pointed out that the legislative history of the Act supports biologically required restrictions on the importation of sport trophies of Threatened species and that the section 9(c)(2) presumption of compliance (see above paragraph) is rebuttable under certain circumstances. The Court accepted the FWS interpretation, thereby not only allowing the argali import regulations to stand but establishing a precedent for more flexibility in future control of foreign wildlife importation.

Prior to the court judgment, there was concern that if the FWS interpretation of section 9(c)(2) were set aside, adequate regulation of argali importation might not be possible. This concern gave increased weight to one of the Act's legal factors for listing, "the inadequacy of existing regulatory mechanisms." Citing this situation and the other problems facing the argali, the FWS issued a new proposal in the April 27, 1993, *Federal Register* that would classify *all* argali populations as Endangered and eliminate the special regulations providing for trophy importation. Although the litigation has concluded, the FWS continues to review new information received during the rulemaking process. It will assess the best available scientific and commercial data on the status of argali populations and management conditions in the three countries where the species is listed as Threatened before reaching a decision on the April 27 proposal.

Dr. Nowak is a mammalogist with the FWS Office of Scientific Authority.

Listing Proposals — August/September 1993

During August and September 1993, 6 animals and 25 plants were proposed by the Fish and Wildlife Service (FWS) for listing as Threatened or Endangered. If the listing proposals are approved, Endangered Species Act protection will be extended to the following:

Arroyo Southwestern Toad (*Bufo microscaphus californicus*)

A riparian species, the arroyo southwestern toad historically occurred in streamside wetlands of southern California, mainly west of the Mojave Desert from San Luis Obispo County, California, to northwestern Baja California, Mexico. Its specific habitat requirements include rivers with shallow, gravelly pools adjacent to sandy terraces with a nearby closed canopy of cottonwoods (*Populus* spp.), willows (*Salix* spp.), and oaks (*Quercus* spp.).

Widespread habitat loss has eliminated this small, buff-colored amphibian from at least 75 percent of its former range. Only 6 of the 15 remaining populations south of Ventura are known to comprise more than a dozen adults. Because of continuing threats, the FWS proposed August 3 to list the arroyo southwestern toad as Endangered.

Two Aquatic Snails

Two freshwater snails were proposed August 5 for listing as Endangered:

- **royal snail** (*Pyrgulopsis ogmorhaphe*), a small species endemic to springs in the Sequatchie River system in Tennessee; and
- **Anthony's riversnail** (*Athearnia anthonyi*), a larger (1-inch, or 2.5-centimeter) species known from the Sequatchie River in Tennessee and Limestone Creek in Alabama.

Both snails are threatened by a general deterioration of water quality resulting from siltation and other pollutants contributed by logging; road construction; cattle grazing; vandalism; improper trash dumping; and agricultural, municipal, industrial, and mining runoff. Increased logging to supply wood chip mills proposed for the area could have further impacts on the aquatic ecosystem. In addition, the once wide distribution of the Anthony riversnail, which depends on shallow, free-flowing habitat, has been reduced significantly by impoundments.

photo by B. "Moose" Peterson/WRP

arroyo southwestern toad

Appalachian Elktoe (*Alasmidonta raveneliana*)

Another freshwater mollusk, the Appalachian elktoe is a small, kidney-shaped mussel or clam. This species is endemic to the upper Tennessee River system in the mountains of western North Carolina and eastern Tennessee. Historical records indicate that the elktoe once was fairly widely distributed, but most of its clean, free-flowing habitat has been degraded or destroyed by impoundments, siltation, and pollution.

Populations of the Appalachian elktoe survive in short stretches of two upper Tennessee River tributaries: the Little Tennessee River in North Carolina and the Nolichucky River in Tennessee and North Carolina. Because both are vulnerable to further water quality degradation, the FWS proposed the Appalachian elktoe on September 3 for listing as Endangered.

Lake Erie Water Snake (*Nerodia sipedon insularum*)

The Lake Erie water snake, a nonvenomous subspecies, is predominantly gray in color and can reach up to 43 inches (110 cm) in length. As its name implies, this snake is native to an archipelago of limestone islands in Lake Erie and adjacent mainland areas of Ohio and Ontario, Canada. It was once abundant and widespread, but has declined dramatically over the past 50 years, and the FWS proposed August 18 to list the subspecies as Threatened.

Most of the islands inhabited by the Lake Erie water snake have been developed or platted for future development, such as marinas and summer homes. Construction has accelerated in recent years, with corresponding habitat losses. In addition, residents often kill the snake in the mistaken belief that it is poisonous.

Northern Copperbelly Water Snake (*Nerodia erythrogaster neglecta*)

A more colorful subspecies, the northern copperbelly water snake has a dark back but a bright orange-red underside. It, too, is nonvenomous. For most of the year, this snake inhabits lowland swamps or other warm, quiet waters. Adjacent wooded cover is needed to provide corridors to upland hibernation sites. Its historical range is described as a region stretching from south-central Michigan and northwestern Ohio, southwestward through Indiana, to extreme southeastern Illinois and adjacent areas of Kentucky. The snake once may also have occupied parts of Tennessee, Wisconsin, Pennsylvania, and West Virginia. Today, however, it survives only in scattered, isolated pockets where suitable habitat remains.

Clearcutting of lowland forests, draining of wetlands, brush clearing, surface mining, road construction, and other land disturbing activities have fragmented or destroyed much of the snake's habitat. Because of continuing losses, the northern copperbelly water snake was proposed August 18 for listing as Threatened.

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Listing Proposals

(continued from page13)

drawing by Yevonn Wilson-Ramsey, reprinted from *Manual of the Flowering Plants of Hawai'i*, courtesy of University of Hawaii Press

Solanum incompletum

Hibiscus brackenridgei

drawing by Yevonn Wilson-Ramsey, reprinted from *Manual of the Flowering Plants of Hawai'i*, courtesy of University of Hawaii Press

Plantago princeps

Coccoloba rugosa

photo by Loyal A. Mehrhoff

drawing by Yevonn Wilson-Ramsey, reprinted from *Manual of the Flowering Plants of Hawai'i*, courtesy of University of Hawaii Press

Spermolepsis hawaiiensis

photo by Eugenio Santiago-Valentin

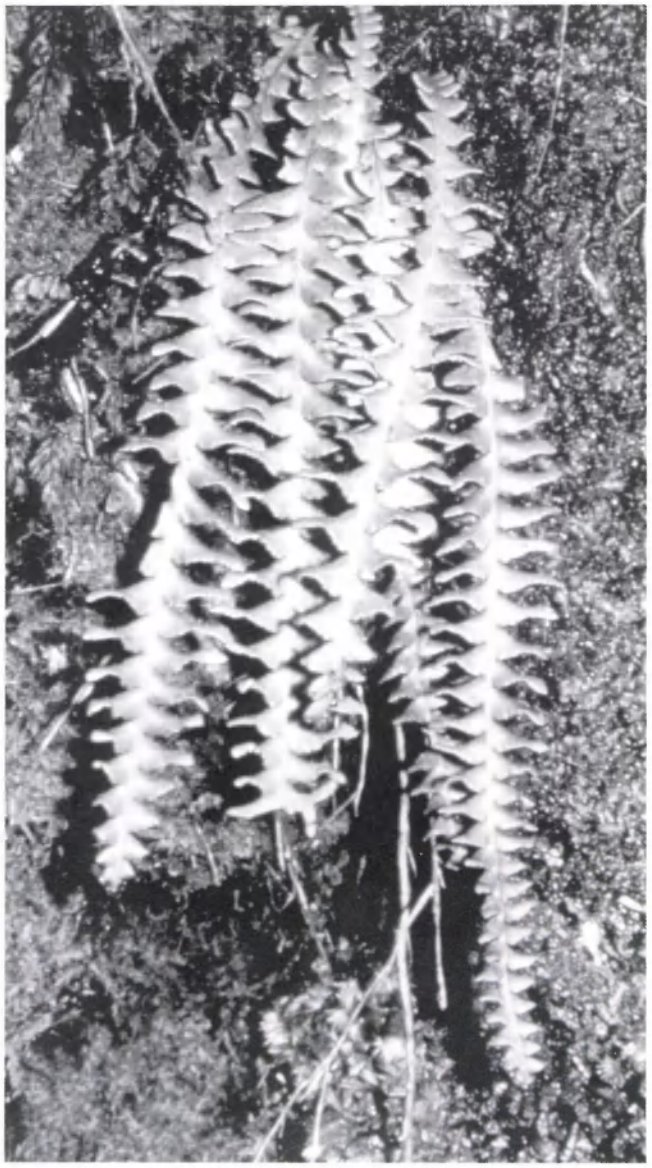

photo by Charles H. Lamoureux

Adenophorus periens

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Listing Proposals

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photo by Loyal A. Mehrhoff

Sesbania tomentosa

Twelve Hawaiian Plants

On September 14, the FWS proposed the Endangered classification for 12 plants native to the Hawaiian Islands:

• *Adenophorus periens*, or **pendant kihi fern** - a small, pendant, epiphytic (not rooted in the ground) fern in the grammitis family (Grammitidaceae);

• *Bonamia menziesii* - a vine in the morning-glory family (Convolvulaceae) with white to greenish funnel-shaped flowers;

• *Diellia erecta* - a fern in the spleenwort family (Aspleniaceae);

• *Flueggea neowawraea*, or **mehamehame** - a large tree in the spurge family (Euphorbiaceae);

• *Hibiscus brackenridgei*, or **ma'o hau hele** - a shrub or small tree in the mallow family (Malvaceae) bearing yellow flowers with maroon centers;

• *Mariscus pennatiformis* - a perennial in the sedge family (Cyperaceae);

• *Neraudia sericea* - a tall, densely hairy shrub in the nettle family (Urticaceae);

• *Plantago princeps*, or **laukahi kuahiwi** - a small shrub or robust perennial herb in the plantain family (Plantaginaceae);

• *Sesbania tomentosa*, or **'ohai** - a sprawling shrub or small tree in the pea family (Fabaceae);

• *Vigna o-wahuensis* - a sprawling annual or perennial herb in the pea family;

• *Solanum incompletum*, or **popolo ku mai** - a shrub in the nightshade family (Solanaceae); and

• *Spermolepis hawaiiensis* - an annual herb in the parsley family (Apiaceae).

These 12 species of Hawaiian plants have relatively wide but scattered distributions across the island chain, and most survive in very small numbers. They grow in a wide range of vegetation communities (grasslands, shrublands, and forests), elevational zones (coastal to subalpine), and moisture regimes (dry to wet).

All 12 of the recently proposed Hawaiian plants have been severely reduced in numbers and range due to widespread habitat modification and the effects of introduced animals and plants. Specific causes include one or more of the following: competition from exotic plants for light, nutrients, and living space; habitat degradation from wild, feral, or domestic animals (deer, cattle, goats, sheep, and pigs); agricultural and recreational activities; human-caused fires; and predation by non-native animals (rats, insects, goats, and cattle). Most of these factors continue to threaten the remaining plants.

Eight California Vernal Pool Plants

A proposal to protect eight plant taxa endemic to vernal pool habitat in California's Central Valley was published August 5. The four at greatest risk, all annual grasses in the family Poaceae, were proposed for listing as Endangered:

• **San Joaquin Valley Orcutt grass** (*Orcuttia inaequalis*);

• **hairy Orcutt grass** (*Orcuttia pilosa*);

• **Sacramento Orcutt grass** (*Orcuttia viscida*); and

• **Greene's tuctoria** (*Tuctoria greenei*).

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Listing Proposals

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Because the danger to the other four plants is not as great, they were proposed for the slightly less critical category of Threatened:

• **fleshy owl's-clover** (***Castilleja campestris* ssp. *succulenta***) - an annual herb in the snapdragon family (Scrophulariaceae);

• **Hoover's spurge** (***Chamaesyce hooveri***) - an annual herb in the family Euphorbiaceae;

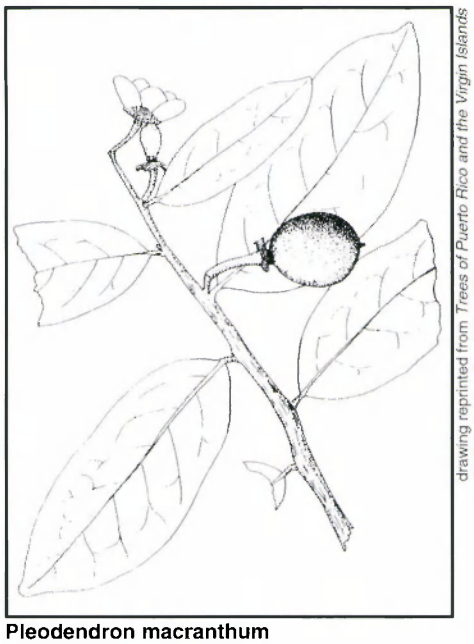
• **Colusa grass** (***Neostapfia colusana***) - another annual grass; and

• **slender Orcutt grass** (***Orcuttia tenuis***).

All eight of these plants are endemic to vernal pools, an unusual habitat type that forms in areas with Mediterranean climates where slight depressions underlain with an impervious soil layer fill with water after fall and winter rains. These seasonal wetlands then dry slowly during the spring and summer. The cyclic wetting and drying create an unusual ecological situation supporting a unique biota. Many plants and animals are adapted specifically to this environment and cannot survive outside the temporary pools.

Vernal pools are not only unusual but also fragile and easily disturbed. Many of the vernal pools in the Central Valley have already been destroyed or degraded by urban and agricultural development, mowing and livestock overgrazing, off-road vehicle use, trash dumping, flood control projects, and invasions of weedy, non-native plants.

The Army Corps of Engineers is responsible under section 404 of the Clean Water Act for regulating the discharge of fill material into wetlands, including vernal pools. If the listing proposal is approved, the Corps will be required to ensure that any section 404 permits it grants will not jeopardize the survival of the plants.



drawing reprinted from *Trees of Puerto Rico and the Virgin Islands (U.S.D.A. Handbook No. 449)*

Pleodendron macranthum

Three Puerto Rican Trees

Three species of trees native to the Commonwealth of Puerto Rico were proposed September 24 for Endangered Species Act protection. The two in greatest danger were proposed for listing as Endangered:

• **uvillo** (***Eugenia haematocarpa***) - a small tree in the myrtle family (Myrtaceae) with leathery leaves and tiny light-pink flowers; and

• **chupacallos** (***Pleodendron macranthum***) - an evergreen in the canella family (Canellaceae) bearing small white flowers and aromatic, purplish-black fruit.

The third species, which is believed to be in less immediate danger, was proposed for listing as Threatened:

• **ortegón** (***Coccoloba rugosa***) - an evergreen in the buckwheat family (Polygonaceae) producing inflorescences with numerous crimson flowers.

Habitat alteration is the main threat to these species, which are already very limited in numbers and range. Although two populations of *C. rugosa*, four populations of *E. haematocarpa*, and all *P. macranthum* sites are on Federal or Commonwealth lands, they are vulnerable to any management practices that do not take their well-being into account. Additionally, 10 *C. rugosa* sites and one *E. haematocarpa* colony are on private lands subject to intense urban, agricultural, and tourist development.

Two Texas Plants

Two species of plants native to southern Texas were proposed August 5 for listing as Endangered:

• **Texas ayenia** (***Ayenia limitaris***) - a pubescent shrub in the cacao family (Sterculiaceae), with a population reduced to a single individual at a site in Hidalgo County; and

• **South Texas ambrosia** (***Ambrosia cheiranthifolia***) - an herbaceous perennial in the aster family (Asteraceae) with seven currently known populations in Kleberg and Nueces Counties.

The Texas ayenia grows in dense subtropical woodland communities along Lower Rio Grande floodplains and terraces, and the South Texas ambrosia occurs in open prairies and savannas. Historically, both species were distributed over a region that included other parts of southern Texas and northeastern Mexico. Widespread habitat loss has reduced the plants in range and numbers, and continues to threaten the surviving populations. Approximately 95 percent of native South Texas brushlands, woodlands, and prairies have been converted to agricultural fields, improved pastures, and urban areas, or cleared for urban water development and flood control. Most native Texas Gulf Coast prairies have been developed for agriculture. The habitats that remain are vulnerable to fragmentation, contamination from agricultural chemicals, and invasion by non-native grasses introduced for cattle grazing.

* * *

Available Conservation Measures

Among the conservation benefits authorized for Threatened and Endangered plants and animals under the Endangered Species Act are: protection from adverse effects of Federal activities; restrictions on

(continued on page 18)

California Condors Moved to New Breeding Facility in Idaho

Twelve California condors (*Gymnogyps californianus*) took the longest flight of their lives on September 23 when they were transported from southern California to the World Center for Birds of Prey in Boise, Idaho. They are part of a captive breeding program directed by the Fish and Wildlife Service in cooperation with the Los Angeles Zoo and the San Diego Wild Animal Park to recover this critically endangered bird. The birds were moved from the two facilities to form the nucleus of a third captive breeding flock, the first outside California.

Seven condors began their journey in San Diego, where they were driven to Miramar Naval Air Station and loaded aboard an Air Force C-141 Starlifter, which was scheduled for a routine training flight to Idaho. Meanwhile, five condors from the Los Angeles Zoo were carried to Los Angeles International Airport and put on a specially equipped Boeing 727 provided by Federal Express, one of the world's largest express shipping companies. A team of zoo and Army veterinarians, along with special condor handlers, accompanied the birds on each flight.

"We owe a special thanks to the Air Force at Edwards Air Force Base for allowing us to take advantage of their training operations and to Federal Express for donating the use of its plane to transfer these condors. Their participation is an essential component to make this cooperative effort a success," said Marvin Plenert, FWS Pacific Regional Director.

Among those welcoming the condors to Boise was Dr. Bill Burnham, President of The Peregrine Fund, which operates The World Center for Birds of Prey. The Fund was selected to operate the third captive breeding facility because of its record of success in propagating other endangered birds of prey. Funds for the Center's new 17,000-square-foot condor breeding facility were provided by the FWS and private contributors (Peter andConnie Pfendler and the Boise Water Corporation).

The 12 birds — 6 males and 6 females — were selected to maximize genetic diversity in the captive breeding population. Biologists hope one of the pairs may breed as early as 1995. Several areas of Arizona and New Mexico are being evaluated as potential release sites for the progeny of the Boise flock. Some condors also could be sent to California to join the birds that have been released there. California condors, the largest birds in North America, once ranged along the entire Pacific coast from British Columbia to Baja California and as far east as Florida. More recently, however, they were confined to an area north of Los Angeles.

There are now 75 California condors, up from a low of 27 in 1987. Four of the eight captive-produced condors released last year in Los Padres National Forest have died, one from ingesting leaked radiator fluid and the others from collisions with power lines. After the death of the fourth condor, the remaining four were captured and moved to a site in Lion Canyon, a more remote (and hopefully safer) area of the national forest. They were joined there by another five captive-produced condors, and all nine birds were released between December 8 and 10. The other 66 California condors are in captive breeding flocks at the World Center for Birds of Prey, San Diego Wild Animal Park, and Los Angeles Zoo.

Listing Proposals

(continued from page17)

take and trafficking; a requirement that the FWS develop and carry out recovery plans; authorization to seek land purchases or exchanges for important habitat; and Federal aid to State and Commonwealth conservation departments with cooperative endangered species agreements. Listing also lends greater recognition to a species' precarious status, encouraging other conservation efforts by State and local agencies, independent organizations, and concerned individuals.

Section 7 of the Act directs Federal agencies to use their legal authorities to further the purposes of the Act by carrying out conservation programs for listed species. It also requires these agencies to ensure that any actions they fund, authorize, or carry out are not likely to jeopardize the survival of any Endangered or Threatened species, or to adversely modify its designated Critical Habitat (if any). When an agency finds that one of its activities may affect a listed species, it is required to consult with the FWS to avoid jeopardy. If necessary, "reasonable and prudent alternatives," such as project modifications or rescheduling, are suggested to allow completion of the proposed activity. Where a Federal action may jeopardize the survival of a species that is *proposed* for listing, the Federal agency is required to "confer" with the FWS (although the results of such a conference are not legally binding).

Additional protection is authorized by section 9 of the Act, which makes it illegal to take, import, export, or engage in interstate or international commerce in listed animals except by permit for certain conservation purposes. The Act also makes it illegal to posses, sell, or transport any listed species taken in violation of the law. For plants, trade restrictions are the same but the rules on "take" are different. It is unlawful to collect or maliciously damage any Endangered plant on lands under Federal jurisdiction. Removing or damaging listed plants on State and private lands in knowing violation of State law, or in the course of violating a State criminal trespass law, also is illegal under the Act. In addition, some States have more restrictive laws specifically against the take of State or federally listed plants and animals.

Young North Dakotans Get Tubs Full of Endangered Species Education

by Dan Licht

photo by Dan Licht

The contents of this "endangered species tub" include a peregrine falcon wing, a gray wolf hide, piping plover eggs in a plexiglass cube, and species "building blocks."

Endangered species staff in the Fish and Wildlife Service's (FWS) North Dakota Ecological Services Office believe in the adage, "An ounce of prevention is worth a pound of cure." As a result, the staff has put together two endangered species "tubs" to respond to requests for presentations about species in danger of extinction. Reaction by teachers and scout troop leaders has been enthusiastic.

Inside each of the plastic tubs is an assortment of endangered species artifacts, games, videotapes, and brochures. Wildlife items came from various FWS offices and programs, such as Ecological Services, Fish Hatcheries, and Law Enforcement. For example, one of the tubs features a least tern *(Sterna antillarum)* nest diorama created by using addled tern eggs in a nest bowl made of sand. The entire scene was fixed with acrylic spray and enclosed within a plexiglass container. The contents of the egg had been carefully removed for contaminants analysis. In the same tub is a plexiglass tube containing a small pallid sturgeon *(Scaphirhynchus albus)* preserved in alcohol. The sturgeon came from a recent hatchery effort and was expendable for educational purposes. Other contents of the tub are the wing of a peregrine falcon *(Falco peregrinus),* a pressed western prairie fringed orchid *(Platanthera praeclara),* and the tanned hide of a gray wolf *(Canis lupus)* shot in the Dakotas.

In addition to the artifacts, the tub includes a game of blocks that represent different species of flora and fauna. Younger students use the blocks to form a pyramid that collapses when too many blocks become "extinct." Other items include plaster casts of tracks from black-footed ferrets *(Mustela nigripes)* and wolves, a wooden ecosystem puzzle, and videotapes about ferrets and bald eagles *(Haliaeetus leucocephalus).* The tub also contains an endangered species book—a three-ringed binder that holds a variety of crossword puzzles, coloring pages, mazes, species fact-sheets, clip-art (computer-generated drawings of wildlife such as plovers and wolves which, when cut out out, can be used as book markers or in collages or games), and even multiple-choice tests about North Dakota's endangered species. The binder approach makes it easy for teachers to duplicate the items they want to use with each class.

Finally, to leave a lasting impression with the students, the tub contains posters and brochures they can keep. There is enough diversity in the tub that grades K-12 can find something of use.

According to Mark Dryer, FWS endangered species senior staff biologist in North Dakota, "One shortcoming of many endangered species outreach efforts, from our perspective, is that they do not discuss species close to home. It's important that North Dakotans, especially children, take pride in their own natural heritage." Adds Kathy Martin, endangered species staff biologist, "The tub was the only way we could efficiently reach the far corners of the State. We typically mail it out on a Friday, the school uses it the following week, and then mails it back."

The cost of materials for each tub is about $300, mostly for the plastic tubs, packing foam, games, and videos. The remaining items were obtained from other FWS offices or created by Ecological Services staff. It took approximately 5 weeks to put together the 2 tubs, but additional tubs should take considerably less time because of the ease in duplicating many items.

The use of tubs for outreach has been so successful that the North Dakota Office is starting a wetland tub and considering others, such as a native prairie tub. Hopefully, an ounce of prevention will indeed be worth a pound of cure.

Dan Licht is a wildlife biologist in the Fish and Wildlife Service's North Dakota State Office in Bismarck.

Final Listing Rules Approved for Eight Species

Final rules adding eight species—six plants and two animals—to the U.S. List of Endangered and Threatened Wildlife and Plants were published by the Fish and Wildlife Service during August and September 1993. These plants and animals now receive Endangered Species Act protection, and plans for their recovery will be developed. A list of the newly added taxa, with their legal classification and *Federal Register* publication dates, follows:

- **Four California Vernal Pool Species**— An August 3 rule listed as Endangered four species endemic to vernal pools in southern California: the **Riverside fairy shrimp** (*Streptocephalus wootton*i) and three annual plants—**Otay mesa mint** (**Pogogyne nudiuscula**), **California Orcutt grass** (*Orcuttia californica*), and **San Diego button celery** (*Eryngium aristulatum* var. *parishii*).
- **Two California Marsh Plants** — A separate August 3 rule listed as Endangered two species of perennial herbs native to the coastal freshwater marshes of San Luis Obispo County, California: the **marsh sandwort** (*Arenaria paludicola*) and **Gambel's watercress** (*Rorippa gambellii*).
- **Pima Pineapple Cactus** (*Coryphantha scheeri* var. *robustispina*) — This attractive, hemispherical cactus native to southern Arizona and northern Sonora, Mexico, was listed September 23 as Endangered.
- **Delhi Sands Flower-loving Fly** (*Rhaphiomidas terminatus abdominalis*) — With its long, tubular proboscis and ability to hover in flight, this nectar-feeding fly in some ways mimics hummingbirds. Unlike pest species, the Delhi Sands flower-loving fly cannot survive in developed areas. It needs natural habitat characterized by fine, sandy soils of a specific type, very little of which remains. This insect, the only remaining subspecies of *R. terminatus*, was listed September 23 as Endangered.

Louisiana Pearlshell Reclassified as Threatened

The Fish and Wildlife Service (FWS) determined September 24 that the Louisiana pearlshell (*Margaritifera hembeli*), a freshwater mussel previously known only in the Bayou Boeuf drainage in Rapides Parish, Louisiana, warrants reclassification under the Endangered Species Act from Endangered to Threatened. The FWS made this change because of improvements in habitat management, a reduction in the threats to the mussel, and the discovery of new populations in the Red River drainage in Grant Parish. Listed in 1988 as Endangered, the species was proposed for reclassification to Threatened on February 26, 1993.

In addition to documenting a larger range than known at the time of listing, recent surveys found evidence of successful reproduction in most, if not all, populations. Management initiatives at Kisatchie National Forest to benefit the pearlshell have included the control of beavers (whose dams had fragmented the mussel's range and flooded its free-flowing habitat) and the establishment of streamside zones to minimize sedimentation during logging operations.

Proposed Reclassifications

No longer believed to be in imminent danger of extinction, three species—a fish, a bird, and a plant—were proposed recently for reclassification from Endangered to the less critical category of Threatened. Although their status has improved, these species are not yet fully recovered, and therefore would retain Endangered Species Act protection:

Pahrump Poolfish (*Empetrichtys latos latos*)

One of the original taxa listed as Endangered in 1967, this small desert fish, also known as the Pahrump killifish, was proposed August 18, 1993, for reclassification. Its improved status is due to cooperative recovery efforts in Nevada by Federal and State agencies and university biologists. The Pahrump poolfish is the sole remaining member of the genus *Empetrichthys,* which as recently as the 1940's included three other subspecies.

Although ground water pumping dried up its only historic location, Manse Spring, the Pahrump poolfish has been released into three other Nevada springs with secure water sources. Each self-sustaining population is comprised of several thousand fish. Two of these populations are on Federal land—Corn Creek Springs on the Fish and Wildlife Service's Desert National Game Range, and Shoshone Ponds on land managed by the Bureau of Land Management. The third population is at Spring Mountain State Park.

Hawaiian Hawk (*Buteo solitarius*)

Another of the original species listed in 1967 as Endangered, the 'io or Hawaiian

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Proposed Reclassifications

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hawk was proposed for reclassification on August 5, 1993, as a result of improved survey techniques and better knowledge of its ecology and life history. In 1967, Hawaiian hawks—which are restricted to the Island of Hawai'i, or the "Big Island"—were thought to number only a few hundred. Today, although the species still faces threats from human disturbance, shooting, contaminants, and some predators, the hawks probably number between 1,400 and 2,500 birds.

Unlike species that exist only in undisturbed areas, the Hawaiian hawk can nest in a variety of habitats, including those modified by humans, such as agricultural lands and exotic forests. Hakalau National Wildlife Refuge and Hawaii Volcanoes National Park are managed to provide habitat for various native birds, including the hawk.

MacFarlane's Four O'clock (*Mirabilis macfarlanei*)

This wildflower, a perennial found in Idaho and Oregon canyonlands, was proposed August 26, 1993, for reclassification to Threatened. MacFarlane's four o'clock is characterized by strikingly large magenta flowers atop stems that have oppositely arranged succulent leaves. In 1979, when the species was listed as Endangered, only 25 to 30 plants in 3 colonies were known. Today, thanks to improvements in grazing management, the discovery of 15 additional colonies, and the stable status of these colonies, the species is estimated to number 8,600.

Regional News

(continued from page 2)

In Texas, Phillips Petroleum has donated four 4-wheel-drive trucks to cooperators assisting with Region 2's sea turtle programs and desert tortoise (*Gopherus agassizii*) studies in Mexico. Formerly used for travelling between West Texas oil fields, the trucks will now support turtle projects, primarily in Mexico, by carrying people and supplies to remote field sites and patrolling beaches, fulfilling the need for transportation on rough, unimproved roads. Three of the vehicles are destined for the International Sea Turtle Program, a cooperative effort sponsored by the FWS. Recipients include the Gladys Porter Zoo in Brownsville, Texas, which is working on the Kemp's ridley sea turtle (*Lepidochelys kempii*) project on Mexico's Gulf Coast; the Universidad de Michoacan, which runs the black sea turtle (*Chelonia agassizi*) project on Mexico's Pacific Coast; and PRONATURA Peninsula de Yucatan, which operates the important hawksbill sea turtle (*Eretmochelys imbricata*) projects in Yucatan with the FWS. The fourth truck will go to Centro Ecologico de Sonora, which works with the FWS on a desert tortoise project in the Sonoran Desert of Mexico.

A transfer ceremony at Gladys Porter Zoo on September 28, 1993, brought together Phillips Petroleum officials, Mexican cooperators, and media representatives, along with FWS staff. Speaking at the ceremony, H. Lindsay Patterson, Phillips' manager of exploration and production, said, "Our people take great care to preserve the sea turtles that live around our offshore platforms in the Gulf of Mexico. With this donation, we become part of a larger effort that is working across international borders to protect shared sea turtle populations." He added that the company would like to continue its cooperative efforts with the FWS. Phillips supports a number of conservation initiatives with the FWS, including wetlands restoration in the Playa Lakes and Gulf Coast Joint Ventures, and (with the Houston Audubon Society) coastal woodlots protection along the Gulf Coast of Texas and Louisiana. Joint Ventures are private and public partnerships to protect and enhance habitat under the North American Waterfowl Management Plan. Phillips has also toppled a petroleum production platform and converted it into an artificial reef as part of its Rigs-to-Reefs program, an initiative with the State of Texas to create new fishing habitat for recreational and commercial purposes.

* * *

On August 23, 1993, the FWS delivered a "no jeopardy" Biological Opinion to the Forest Service in response to a request for a programmatic Section 7 consultation on projects affecting the Mexican spotted owl (*Strix occidentalis lucida*). The Forest Service proposed 88 projects dealing primarily with timber harvest and management on 10 national forests in New Mexico and Arizona. Preparing the biological opinion was a team effort by staff from the FWS New Mexico and Arizona State Ecological Services Field Offices and the Regional Office's Division of Endangered Species/Permits. In addition, personnel from other FWS field offices were detailed to help with the effort.

* * *

Winter crop depredation by sandhill cranes (*Grus canadensis*), particularly on alfalfa and chilies in the Middle Rio Grande Valley, New Mexico, was the concern of farmers and State and Federal wildlife biologists who met recently to explore means of alleviating the problem without harm to whooping cranes (*Grus americana*) that also pass though the area. Representatives from the New Mexico Game and Fish Department, Bosque del Apache National Wildlife Refuge (NWR), and the FWS Albuquerque Regional Office attended.

The result was an extension in the sandhill crane hunting season, which previously ended November 1, a date before most whooping cranes from the experimental Rocky Mountain flock migrate

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Contributing to the *Endangered Species Technical Bulletin*

The *Endangered Species Technical Bulletin* was created in 1976 to meet the growing demand for news of developments in the endangered species program. The *Bulletin* is the primary means by which the Fish and Wildlife Service disseminates information on rulemakings (listings, reclassifications, and delistings), regulatory changes, section 7 interagency consultations, recovery plans and activities, changes in species' status, research developments, new ecological threats, and a variety of other issues.

The *Bulletin* has an increasingly diverse audience and a current circulation of about 8,500. The Service is authorized to provide this publication to:

- biologists, other natural resource managers, and administrators in a wide variety of Federal, State, and local agencies. The *Bulletin* is of interest not only to natural resource agencies but also to other agencies that may be affected by endangered species program activities.
- members of Congress and staff directors of major committees.
- conservation groups and other interested organizations.
- scientists with whom the Service regularly works.
- major public and university libraries.

In response to demand from teachers, consulting firms, concerned citizens, and others, the Service set up an agreement with the University of Michigan in 1982 to make the *Bulletin* available to anyone who is interested. Under this arrangement, the University reprints the *Bulletin* as part of its own publication, the *Endangered Species Update*. The *Update* is sold on a not-for-profit basis (currently $23 per year) and has about 1,200 subscribers.

We Need Your Help!

Because of its increasingly diverse audience, the *Bulletin* is seeking to diversify and expand its coverage of endangered species issues. With the Endangered Species Act due for reauthorization, the *Bulletin* also will become more important as a means of public outreach. We need your help in bringing broader coverage of the endangered species program to the public.

Material on a wide range of topics relating to endangered species is welcome, and it may be technical or popular in nature. We are particularly interested in news about recovery (both the development of new recovery plans and their implementation); interagency consultations (including biological opinions rendered, reasonable and prudent alternatives identified, etc.); Habitat Conservation Plans; other cooperative ventures with Federal and State agencies, conservation organizations, business, and private landowners; changes in a species' status; and significant new threats.

Before preparing a manuscript, please contact the *Bulletin* Editor (703/358-2166) to determine the proper length, focus, and timing of proposed articles. Although we welcome submissions, we cannot guarantee their publication in the *Bulletin*. (Authors will be notified if their material is not used.) Manuscripts may be circulated to reviewers for technical content and consistency with Fish and Wildlife Service policies. They may also be edited for length, style, and clarity. The *Bulletin* editorial staff will consult with authors on changes that may affect the content of a manuscript, and authors will have an opportunity to review edited material before publication. Credit will be given for all articles and illustrations used.

Style

When preparing a manuscript, follow the *GPO Style Manual*. Keep in mind the diversity of the *Bulletin* audience. People from many different backgrounds are added to the mailing list each month, and discussing the context of an issue is an important aid to new readers. Footnotes and references are acceptable for technical articles.

Contributions need not be technical; there is also a need for material of wider interest. Feature articles are particularly welcome. We encourage authors to adopt a popular, general audience style with an attention-grabbing opening. Indulge your creative impulse, and have fun!

As a general rule, feature articles should be between three and nine double-spaced pages in length. Shorter items can be sent to the appropriate Regional endangered species specialist for inclusion in the Regional News column. Notices and announcements may be mailed directly to the Editor.

Because the *Bulletin* recipients include many scientists and foreign subscribers, please include in all material:

- scientific as well as common names of all species mentioned (non-listed as well as listed species).
- metric equivalents for all measurements (including area and volume).
- Celsius and Fahrenheit equivalents for temperatures.
- complete names or terms to accompany the first use of all abbreviations and acronyms.

Submissions should always include the author's name, position, duty station, address, and telephone number.

Illustrations

Photographs and/or line drawings are very important, and should be submitted with all articles as available. Photographs are particularly welcome, and can be provided as transparencies, prints (black-and-white preferred), or negatives. Include the photographer's name and material for a caption. Material will be returned upon request. Please obtain in advance the necessary permission for the *Bulletin* to publish the illustrations.

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Contributing to the Bulletin

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Submission Format

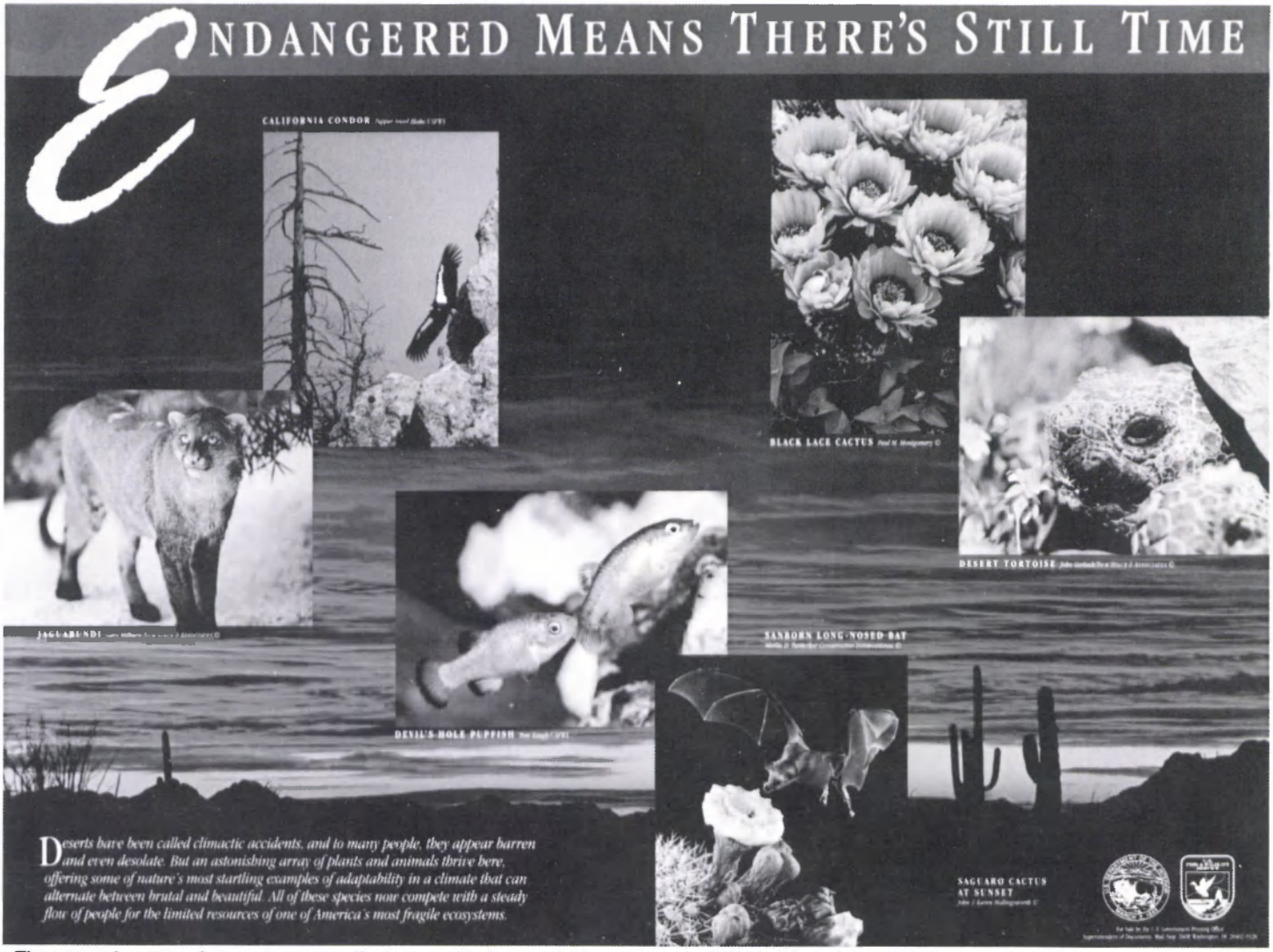
Manuscripts for the *Bulletin* can be submitted several ways. We prefer to receive computer files in Wordperfect 5.1 format. Please transmit them via CC:MAIL (send to R9FWE_OA.BCI). You may also mail DOS-formatted diskettes to Endangered Species Technical Bulletin, U.S. Fish and Wildlife Service, 320 ARLSQ, Washington, D.C. 20240. Submissions by FAX can be sent to 703/358-1872 (703/358-2166 to confirm). In all cases, please mail a double-spaced hard copy.

Printing Schedule

The *Bulletin* is converting to a bi-monthly printing schedule, with six issues per year and an index. To achieve this goal, the following schedule has been established for the upcoming year:

1994 ISSUE DATE	COPY DUE DATE
February	December 1, 1993
April	February 1, 1994
June	April 1, 1994
August	June 1, 1994
October	August 1, 1994
December	October 1, 1994

We welcome contributions at any time, but material not received by the "Copy Due" date will be held for the next issue.



The second poster of a new series on the theme "Endangered Means There's Still Time" depicts six animals and plants native to desert regions of the United States: the desert tortoise, Devil's Hole pupfish, black lace cactus, Sanborn's long-nosed bat, jaguarundi, and California condor. Future editions of the series will feature endangered species from a variety of habitats. These posters are designed to raise public awareness of lesser known types of rare wildlife.

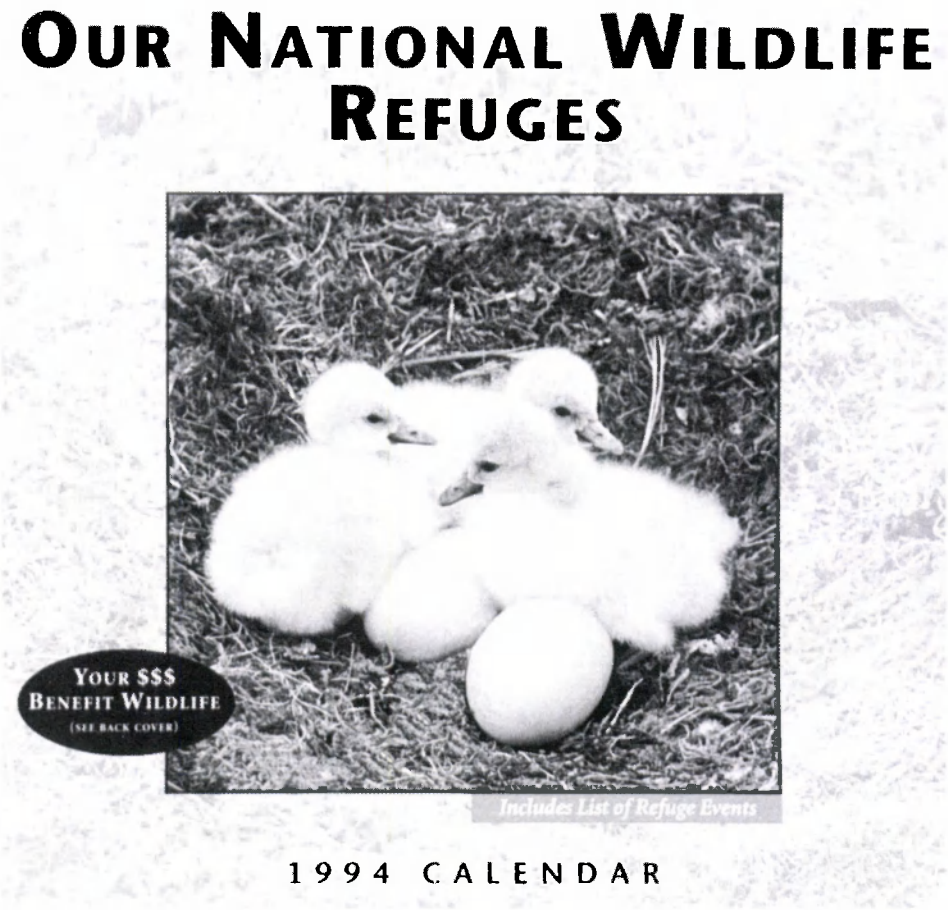
The full-color, 16-by-22-inch desert poster can be purchased by writing the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, or by calling 202/783-3238. The price is $5.50; ask for product number 024-010-00698-6. Copies of the first poster in the series, which illustrates coastal species, are still available for $4.95; ask for product number 024-010-00693-5.

New Publications

1994 Refuge Calendar

Our National Wildlife Refuges, a new full-color calendar for 1994, features 28 of our nation's natural treasures. Created by photographers John and Karen Hollingsworth, the calendar focuses on the diversity of habitat and species within the National Wildlife Refuge System, and includes an educational text to invite further exploration. The calendar also includes a list of refuge events nationwide, highlighting special activities, festivals, and wildlife migratory routes.

For every calendar purchased, the Hollingsworths will donate 50 cents to the National Wildlife Foundation, which will match their donation. The funds will be directed by the Foundation to habitat restoration and/or environmental education projects on national wildlife refuges. To order, send $11.50 (shipping and handling included) to Reflections of Nature, P.O. Box 235, Bellvue, Colorado 80512-0235.



Updated Endangered Species List Available

A new U.S. List of Endangered and Threatened Wildlife and Plants, updated through August 23, 1993, is now available. For a copy, write the U.S. Fish and Wildlife Service, Publications Unit, 130 WEBB, Washington, D.C. 20240.

Biodiversity on Private Lands: An Initiative of the President's Commission on Environmental Quality, describes how 16 corporations began integrating biodiversity conservation into the management of private lands. By developing partnerships with government agencies, private organizations, and academic institutions, corporate land managers assessed conservation opportunities, then planned and implemented projects to combine biodiversity with economic uses of land. The 24-page color booklet, made possible by a challenge grant from the National Fish and Wildlife Foundation, is available from International Paper, Route 1, Box 421, Bainbridge, Georgia (telephone 912/246-3642; FAX 912/243-0766.

New Publications

California—Vanishing Habitats and Wildlife, a 144-page softbound volume with text and photographs by B. "Moose" Peterson , explores California's deserts and grasslands, fresh and salt water marshes, old growth and riparian forests, mountains and valleys, Sacramento Delta, and San Francisco Bay. It features over 90 full-color photographs of the State's rare wildlife and its habitats, and includes a foreword by Roger Tory Peterson.

See below for an excerpt from the book.

To order, write the Beautiful America Publishing Company, P.O. Box 646, Wilsonville, Oregon 97070, or call toll-free at 1-800-874-1233. The price is $21.95 (shipping not included).

LoKern

photo by B. "Moose" Peterson/WRP

A San Joaquin kit fox family.

LoKern could be called the Carrizo/Elkhorn's sister in that they share much of the same habitat. Butting up against the Elkhorn Hills west of Buttonwillow, the four thousand acres of the LoKern are a small fraction of its once greater whole. Though the Temblor Mountains divide the Carrizo/Elkhorn from the LoKern, many species live in both areas. The one feature that does distinguish them is that LoKern is located within the San Joaquin Valley, tucked away on its southwestern edge. Because of this, LoKern protects a couple of other native endangered species not found over the hill.

The LoKern is the last significant intact remnant of native San Joaquin saltbush and alkali sink scrub habitat. A major plant of the grasslands is the alkali-tolerant saltbush. It in turn supports other smaller plants that take advantage of its shade and of the nutrients the dead plant material adds to the soil. The endangered California jewel-flower, Hoover's wooly-star, and Kern mallow all reside in this plant community. In fact, the entire world population of Kern mallow lies in the safety of LoKern.

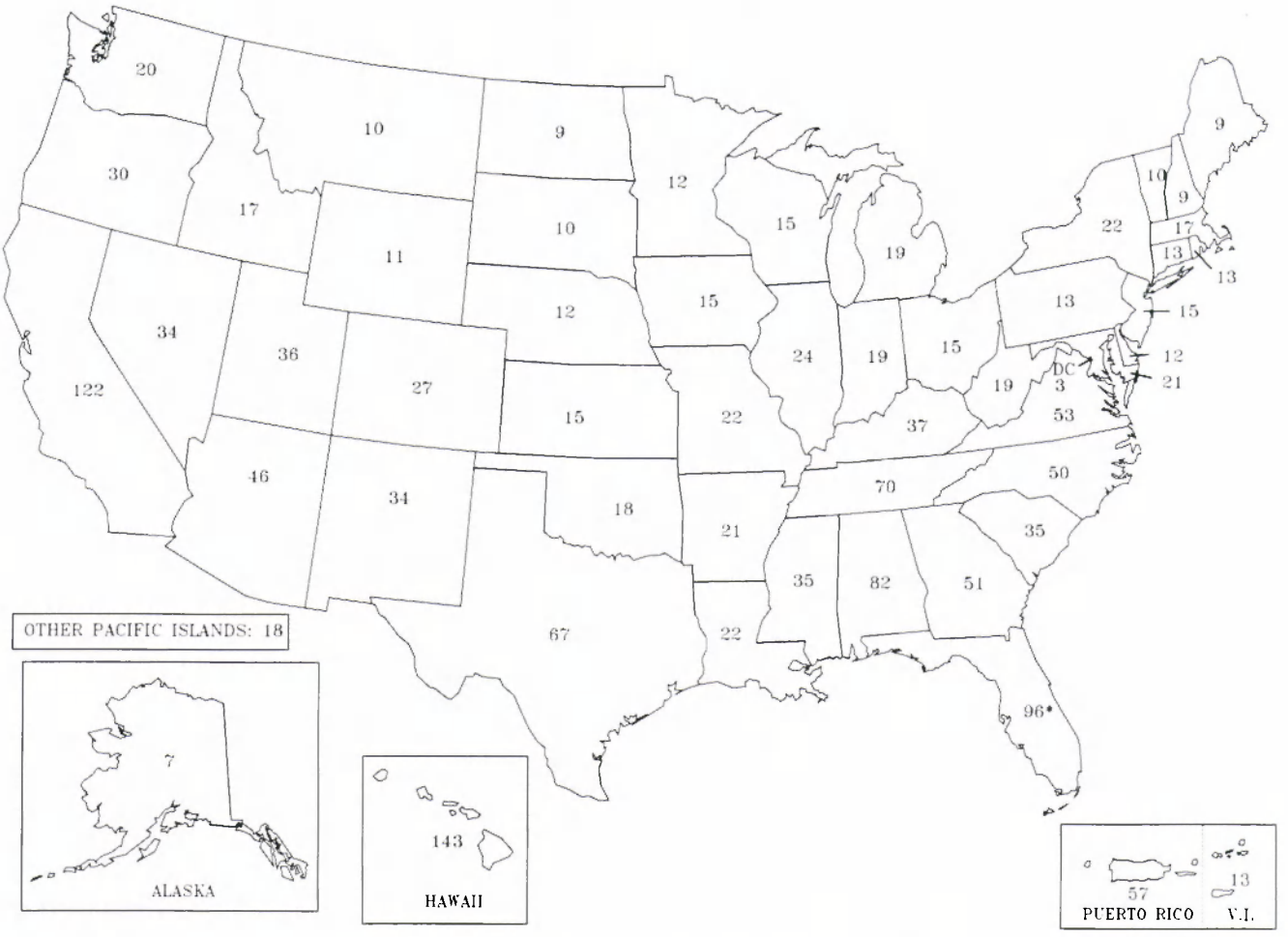
The saltbush also provides homes and cover for many bird species; the most notable is the LeConte's thrasher. Like so many birds and animals, much of its specialized, desert-grassland habitat has been lost and LoKern is the only stronghold left to it in the valley.

This diverse habitat also supports a number of birds under consideration for listing as endangered—the mountain plover, long-billed curlew, and ferruginous hawk. They are winter visitors to LoKern, depending on its unique features to supply them with the needed food reserves for their return migration north.

This rich plant life also supports the short-nosed, Tipton, and giant kangaroo rats, San Joaquin pocket mouse, blunt-nosed leopard lizard, and San Joaquin antelope squirrel. These in turn support the San Joaquin kit fox. The web of life in this "desert" community staggers the imagination. And LoKern supports some of the largest known concentrations of these endangered wildlife and plants, an island unto itself.

Listed Species By State/Territory As of November 30, 1993

(Omits "similarity of appearance" and some extirpated species)



Regional News

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into New Mexico. The surviving members of the cross-fostered flock spend the winter primarily on Bosque del Apache NWR and State game areas that are not open to sandhill crane hunts.

New Mexico will have seven 2-day sandhill crane hunts during October, December, and January to diminish crop depredations. Hunts for another whooping crane "look-alike" species, the snow goose (*Chen caerulescens*), in the Middle Rio Grande Valley have occurred without known harm to whooping cranes. Measures taken to protect whooping cranes will be similar to those used in the past, including distributing educational materials, training hunters in bird identification and requiring them to pass a written examination, and immediately closing any hunt zone if a whooping crane enters the area.

* * *

Region 3 - Region 3 biologists have taken the lead in the section 7 consultation with the Environmental Protection Agency for the proposed Great Lakes Water Quality Guidance, an initiative to ensure consistent water quality standards among all States within the Great Lakes watershed. The Chicago Metro Wetlands Office had an introductory meeting to discuss the consultation process and expects to convene a second meeting soon.

* * *

Staff from the FWS Region 3 Office and Green Bay Field Office joined staff from the Forest Service in searching for the goblin fern (*Botrychium mormo*), a Category 2 listing candidate, in the Chequamegon National Forest in Wisconsin. Although this population numbered about 1,000 plants when it was discovered in 1979, researchers located only 24 plants this year. The reason for the decline is unknown; the habitat has not been disturbed. Weather conditions may affect the goblin fern on a delayed basis.

* * *

A September 15 pipeline break caused diesel fuel to spill into the only place in the world the Endangered white cat's paw pearly mussel (*Epioblasma obliquata perobliqua*) is known to exist, Fish Creek in northeast Indiana and northwest

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Regional News

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Ohio. The ruptured pipeline discharged an estimated 30,000 gallons of #2 diesel fuel in a crop field in DeKalb County, Indiana. Spilled fuel made its way to a small drainage ditch that discharges into Fish Creek. Fish Creek is also home to two other Endangered mussel species, the northern riffleshell (*Epioblasma torulosa rangiana*) and the clubshell (*Pleurobema clava*), as well as the salamander mussel (*Simpsonaias ambigua*), a listing candidate. The area provides habitat for migratory birds including passerines, waterfowl, wading birds, piscivorous birds, and raptors.

While response action probably limited potential damage, it did not prevent injury and will not address residual effects. Fuel has accumulated along the banks and in detrital organic matter and sediment. Staff from the FWS Bloomington, Indiana, Field Office, Indiana Department of Natural Resources, and Ohio Department of Natural Resources are assessing the damage to the mussel community of Fish Creek.

* * *

Interagency cooperation characterized a September 8 meeting of the Niangua Darter (*Etheostoma ninguae*) Recovery Team at Lake of the Ozarks, Missouri. Agenda items featured current research on this State endemic fish, monitoring surveys, artificial propagation, problems associated with gravel dredging, water quality issues, increased coordination among agency staffs, an improved public education program, and funding needs. In addition to biologists from the FWS Columbia, Missouri, Field Office, participants included staff from the Missouri Department of Conservation, the U.S. Army Corps of Engineers, the Missouri Highway and Transportation Department, the University of Missouri's Cooperative Fish and Wildlife Research Unit, and the Sierra Club.

* * *

Region 5 - From July 6 to 8, 1993, the FWS, the IUCN/SSC Captive Breeding Specialist Group, and The Nature Conservancy sponsored a Population and Habitat Viability Assessment (PHVA) for the sandplain gerardia (*Agalinis acuta*), an Endangered plant. Held at The Nature Conservancy's Mashomack Preserve on Shelter Island, New York, the 3-day workshop brought together experts from throughout the species' range to assess recovery efforts during the last 5 years and formulate plans. The PHVA uses computer simulation models to test management scenarios and population dynamics assumptions.

* * *

The FWS Virginia Field Office recently completed a no-jeopardy Biological Opinion on impacts to the bald eagle (*Haliaeetus leucocephalus*) from five proposed shoreline facilities as described in applications for U.S. Army Corps of Engineers construction permits. The projects would allow private boat access within the largest summer concentration of eagles in the eastern United States—a 7-mile stretch of the James River in Virginia. Although the Corps has agreed to the Biological Opinion terms and conditions that include no private boat-ramp building, the local government on one side of the river continues to pursue construction of a public boat-ramp. The FWS maintains that such a ramp within or adjacent to this concentration area is likely to result in serious impacts to bald eagle use. Migrant and resident eagles forage and loaf along the shoreline during the day and roost in the James River National Wildlife Refuge at night. Eagles use this segment of the river because it is undisturbed, has extensive flats and shallow water areas for feeding, and offers a large food base. Human disturbance is increasing, mainly through development and boat traffic.

* * *

Recently, the FWS and the Environmental Protection Agency drafted an interagency agreement that provides funding to the FWS to implement watershed protection in the Upper Tennessee River Basin of southwestern Virginia. This basin includes the Clinch, Powell, and Holston Rivers, which have a high concentration of federally listed species, including 14 mussels and 3 fish. At least 30 other State and Federal agencies and private conservation groups have also recognized the importance of this biologically rich ecosystem and are actively implementing a wide variety of conservation measures and ecological research. To date, more than 5 miles of riparian habitat have been restored under a cooperative agreement between the FWS and The Nature Conservancy (TNC). In addition, the Virginia Department of Game and Inland Fisheries cooperated with the Virginia Water Resources Research Center, TNC, and the FWS to obtain a grant from the National Fish and Wildlife Foundation to expand public outreach activities in the Basin, restore degraded riparian habitats, and reintroduce native mussels into these recovered habitats. Grant activities are scheduled to begin this year.

* * *

Winter 1992-93 bat surveys by the West Virginia Division of Natural Resources tallied 85,374 bats in 35 caves and one limestone mine. Hellhole Cave, West Virginia's most significant hibernaculum, contained 75,204 bats, including 5,618 Indiana bats (*Myotis sodalis*) and 4,965 Virginia big-eared bats (*Plecotus townsendii virginianus*). Researchers found seven species.

In June 1993, biologists using night-vision equipment to census 12 *P. t. virginianus* summer colonies, including a new one discovered late in the summer of 1992, counted 5,943 adults.

* * *

The discovery of a new bald eagle nest in West Virginia brought the State total to five. Four of these nests fledged two chicks each, and the fifth appears to have fledged at least one eaglet.

Intensive searches failed to locate any nesting peregrine falcons (*Falco peregrinus*) in the State. Biologists did find eight breeding pairs of loggerhead shrikes (*Lanius ludovicianus*), a Category 2 listing candidate.

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Regional News

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Between July 1, 1992, and June 30, 1993, researchers with the West Virginia Division of Natural Resouces (WVDNR), the Monongahela National Forest, and West Virginia University captured 47 Endangered northern flying squirrels (*Glaucomys sabrinus fuscus*) during spring and fall monitoring for species population and distribution in the State. The 18 capture sites included 2 new ones. While the flying squirrels were "in hand," WVDNR researchers conducting a food habits study analyzed 66 fecal samples, which showed that the animals' diet consists of lichens, pollen, and fungi.

* * *

WVDNR researchers discovered a new population of the Endangered clubshell mussel (*Pleurobema clava*) in Hackers Creek, a tributary of the West Fork River in the Monongahela River drainage. They also found new populations of two other mussels that are Category 2 listing candidates—the green floater (*Lasmigona subviridis*) in Clover Lick Creek, a tributary to the Greenbrier River, and the brook floater (*Alasmidonta varicosa*) in Patterson Creek, which flows into the North Branch of the Potomac River.

* * *

Surveys for the Threatened Cheat Mountain salamander (*Plethodon nettingi*), a West Virginia endemic, have helped to define the overall range of the species. Dr. Thomas Pauley of Marshall University in Huntington, West Virginia, found only one new population at the edge of its range.

BOX SCORE
LISTINGS AND RECOVERY PLANS

Category	ENDANGERED U.S.	ENDANGERED Foreign Only	THREATENED U.S.	THREATENED Foreign Only	LISTED SPECIES TOTAL	SPECIES WITH PLANS
Mammals	55	251	9	22	337	36
Birds	72	154	17	0	243	73
Reptiles	17	63	18	14	112	27
Amphibians	6	8	5	0	19	9
Fishes	59	11	39	0	109	60
Snails	12	1	7	0	20	26
Clams	50	2	6	0	58	40
Crustaceans	11	0	2	0	13	4
Insects	15	4	9	0	30	15
Arachnids	4	0	0	0	4	0
Plants	326	1	77	2	406	176
TOTAL	629	495	189	38	1,351*	466**

Total U.S. Endangered	629	(303 animals, 326 plants)
Total U.S. Threatened	189	(112 animals, 77 plants)
Total U.S. Listed	818	(415 animals, 403 plants)

* Separate populations of a species that are listed both as Endangered and Threatened are tallied twice. Those species are the leopard, gray wolf, grizzly bear, bald eagle, piping plover, roseate tern, chimpanzee, Nile crocodile, green sea turtle, and olive ridley sea turtle. For the purposes of the Endangered Species Act, the term "species" can mean a species, subspecies, or distinct vertebrate population. Several entries also represent entire genera or even families.

** There are 369 approved recovery plans. Some recovery plans cover more than one species, and a few species have separate plans covering different parts of their ranges. Recovery plans are drawn up only for listed species that occur in the United States.

Number of CITES Party Nations: 120

December 1, 1993

November/December 1993 **Vol. XVIII No. 4**

ENDANGERED SPECIES

Technical Bulletin

Department of Interior, Fish and Wildlife Service
Washington, D. C. 20240